

Nine battlefield tourniquets systems were offered for testing to the United States Army Institute of Surgical Research via a request for products. These included 7 commercially available systems and 2 prototype systems. Eighteen human subjects were used to test the effectiveness of each device in accordance with an IRB approved protocol. Success was based on ability to occlude arterial blood flow in the proximal thigh (elimination of Doppler pulse in the posterior tibial artery). Additionally, the subjects rated each tourniquet for pain using a visual analog pain scale.

Two tourniquets were rejected based on weight and/or faulty design. Of the remaining seven tourniquets, three were effective in 100% of the subjects. These included one pneumatic and two strap type tourniquets; the Emergency Medical Tourniquet (EMT) (Delfi Medical Innovations); the Combat Application Tourniquet System (CATS) (NSN: 6515-01-521-7976) (Phil Durango, LLC); and the Special Operation Forces Tactical Tourniquet (SOFTT) (NSN: 6515-08-137-5357) (Tactical Medical Solutions LLC), respectively.

The two strap tourniquets used a built in windlass as the mechanism for tightening. Of the two successful strap type tourniquets, the CATS was less painful, easier to use, smaller and lighter than the SOFTT (59 grams vs. 160 grams). The design of the SOFTT limited the ability of the windlass to tighten the tourniquet, i.e., it was limited to approximately 3 turns. This limitation can be overcome through training the user to pull the tourniquet snug before attempting to tighten with the windlass. The EMT pneumatic tourniquet was wider and thus significantly less painful than any device tested and is much less likely to induce nerve damage compared to either of the strap tourniquets. The EMT weighs 215 grams and when packaged is similar in size to the SOFTT.

Based on these facts it is recommended that the CATS be issued to each individual soldier, and the EMT pneumatic tourniquet be considered for issue to combat medics. Further, it is recommended that the EMT be issued for all medical evacuation vehicles and echelon I-III medical facilities.